

NNS Computing Facility Manual
P-17 Neutron and Nuclear Science

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*NNS Computing Facility Manual
P-17 Neutron and Nuclear Science*

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Los Alamos
NATIONAL LABORATORY

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Introduction

This document describes basic policies and provides information and examples on using the computing resources provided by P-17, the Neutron and Nuclear Science (NNS) group. Additional help is available from a variety of sources. If you have questions about using the NNS computing facilities which are not answered in this brief document, send E-mail to: `system@nns.lanl.gov` (Internet) or `NNS::SYSTEM` (DECnet).

NNS Computers

Most user accounts are assigned to a cluster consisting of two Digital Equipment Corporation (DEC) computers running the VMS operating system: P17H (a VAXstation 3200) and P17M (a VAXstation 4000). For DECnet applications such as MAIL and SET HOST these machines can be referred to as NNS (Neutron and Nuclear Science). The machines share the same disks and therefore the same user directories and passwords.

Users planning on running the LAHET Code System (MCNP, etc.) or other CPU intensive programs are given accounts on our Hewlett Packard Apollo 9000 workstations running HP-UX, Hewlett Packard's version of the UNIX operating system: P17UA (an HP-735) and P17UB (an HP-730). These machines also share the same disks, user directories and passwords but are not currently clustered.

Policies

We are attempting to adhere to a "friendly user" policy to share resources as well as possible without implementing formal limitations such as disk quotas. We expect users to voluntarily comply with the following requests so that all users may have an equal chance to use the resources available. If voluntary compliance is not met, the system managers may have to impose restrictions, or (in an emergency) cancel running jobs, delete files, or even remove accounts belonging to offending users.

1. Please delete immediately any files you do not need. Store files you use and need regularly on the user disk. The scratch disks are intended only for temporary storage of large files. ***Files on the scratch disks that are more than 72 hours (three days) old are deleted automatically by the system.***

2. ***Use batch mode to run CPU-bound jobs.*** This can be accomplished using the submit command on the VAXes, and "sub" on the HPs. Run long jobs between 8 p.m. and 8 a.m. whenever possible. See the instructions later in this document for help on these commands.

3. ***Users are responsible for backing up their own data.*** The system managers will not be responsible for restoring users' files that have been deleted in the normal course of operations. Although backups of the user disks are made on a regular basis, these backups are for restoring disks in event of a disk failure and do not always lend themselves to restoring a few specific files. Files can be backed up across the network to a disk on another computer or to the tape drive(s) installed on almost every machine. ***The scratch disks are never backed up.***

4. Although every effort will be made to reassign the same data acquisition computer to the same experimenters for each run cycle, there is no guarantee that experimenters will be assigned the same computer for all experiments. Experiments assigned beam time have top priority for use of the data acquisition computer assigned to the flight path (or experiment). ***At the end of an experiment all data should be backed up by the experimenters so that the next user may have full use of the disk. Non-local users should be especially careful to take copies of their data with them when they leave for extended periods.***

5. All users are expected to understand and comply with policies regarding the use of Laboratory computers, computer security, and software protection. By signing for a password, users signify their agreement not to misuse their accounts and accept responsibility for any activity associated with their username and password.

User Accounts

Once an account application has been completed and validated, an account is created on the user disks on the VAXcluster. This account should be used to receive mail, analyze data, create graphics, edit files, etc. A directory is also created for each user on the scratch disks to be used for temporary storage of large files. Experimenters can also request that a home directory is created for them on their data acquisition computers for replay and data analysis. Data acquisition accounts (ONLINE1, MP10REP, etc.) should never be used for anything but data acquisition. For CPU-intensive jobs users should request a separate account on the Hewlett Packard workstations.

Passwords

When you first log in, the operating system will tell you that your password has expired. This is a security feature which allows you to choose a password that not even a system manager will know. The operating system automatically checks your password against a list of common words and names. Old passwords may not be reused. Passwords that do not pass these tests are not accepted. From a security standpoint, the best passwords to use are comprised of letters and numbers. HP-UX requires that you select a password that contains both.

VMS Login Example

Username: *(type your username)*

Password: *(type your temporary password)*

Your password has expired; you must set a new password to log in

New password: *(type the password you have chosen)*

Verification: *(re-type the password you have chosen)*

P17M> \$ *(system prompt)*

P17M> \$ lo *(to log out)*

To change your password at any other time, type SET PASSWORD at the system prompt.

HP-UX Login Example

login: *(type your username)*

Your password has expired. Choose a new one

Changing password for username

New password: *(type the password you have chosen)*

Re-enter new password: *(re-type the password you have chosen)*

login: *(type your username)*

Password: *(type your new password)*

p17ua% *(system prompt)*

p17ua% ^d *(to log out)*

To change your password at any other time, type passwd at the system prompt.

Home Directories

VMS

With the exception of special accounts (ONLINE1, MP10REP, etc.), the default login disk and directory for all users logging in to any host in the VAXcluster (P17A - P17N) is `USERH: [username]`. This allows users to read their mail from any host in the cluster and to use the same LOGIN.COM and EDITINI.EDT files on all hosts. If you prefer to use another user disk when logged in to a host other than NNS (P17H or P17M), add the following line to your LOGIN.COM file and you will automatically set your default (i.e., change your directory) to the user disk on that host each time you log in. `USER_DISK` is a logical name defined as the host-specific user disk.

```
$ SET DEFAULT USER_DISK:
```

Host specific commands you have set up in another file on the user disk (named `P17A_LOGIN.COM` for example) which are specific to a particular host can then be executed by adding another line to your `USERH: [username] LOGIN.COM` following the `SET DEFAULT USER_DISK` command.

```
$ IF F$SEARCH("P17A_LOGIN.COM") .NES. "" THEN -
    @P17A_LOGIN
```

Remember that any changes you make to a login.com file do not take effect until you log out/in again or execute the command with `@LOGIN`.

To access your directory on the scratch disk:

```
$ SET DEFAULT SCRH:
```

Note Files on the scratch disk are automatically deleted every three days and because the scratch disk is never backed up, these files cannot be restored for you.

USERH is physically mounted on P17H. SCRH is physically mounted on P17M. These disks are made available to the other cluster hosts over the network. Disk access over the network is slower. If you expect to run a program that will require a lot of disk accessing, the program will run more quickly if you log in to the host where the disk is physically mounted.

HP-UX

The default login disk and directory for users logging in to the HP workstations is `/users/username`. The workstations share disks. The default login shell is `tcsh`, an enhanced version of `csch` which allows VMS-style command line editing and recall using the arrow keys and includes other features. Type `man tcsh` for more information. The login scripts for this shell are `.login` and `.tcshrc` and they can be modified to change your environmental variables, define aliases, etc.

To permanently change your login shell, use the `chsh` (**change shell**) command:

```
% chsh username full_shell_name
```

For example, if you prefer to use the Korn Shell first copy the default local login script to your home directory and modify it for your environmental variables and create a `.kshrc` script for your shell variables, then issue the command to change your shell and log out/in again or type `source .profile` and `source .kshrc` to have the new shell take effect.

```
% cp /etc/d.profile /users/username/.profile
```

```
% vi .kshrc
```

(Get out of the vi editor and save the file.)

```
<esc>
```

```
:wq
```

```
% chsh username /bin/ksh
```

To access your directory on the scratch disk, type

```
% cd /scratch/username
```

Note *Files on the scratch disk are never backed up.*

NNS Computing Facility Manual

Getting Help

If you are unfamiliar with any aspect of the computing facilities at NNS, help is available from a variety of sources. Try consulting online help or the manuals first. If you are unsure of how to find help for a particular topic, send electronic mail to `system@nns.lanl.gov` (Internet) or `NNS::SYSTEM` (DECnet) or `SYSTEM` if you are logged in to the NNS VAXcluster. See the **Mail** chapter later in this document for help on sending mail.

Online Help

Online help is available for both VMS and HP-UX hosts. To access VMS help type `HELP` at the system prompt, then enter the topic you are interested in or just `HELP topic` if you already know the topic you would like help on. For help on topics specific to NNS hosts, type `HELP @NNS`.

To access HP-UX help, type `man command`. For help on topics specific to NNS hosts type `nnshelp`.

Help for XSYS, the most widely used data acquisition program at NNS, is available online from any VMS account by typing `HELP @XSYS` or typing `xhelp` from the `ONLINE1` account.

Bulletin Board

News of general interest to NNS VAX users is posted in the online bulletin board. The bulletin board should be checked regularly for important information which may be too detailed to include in the online welcome message. The bulletin board can be accessed by typing BB. A menu window will appear on your screen which looks similar to the following.

Please choose a category by number:

1. Read ADMINISTRATION boards
2. Read COMPUTER related topic boards
3. Read OPERATIONS topic boards
4. Exit the Bulletin Board utility

| Category number: |
| | |

At the Category number, type 2 to access the COMPUTER related topic boards. After selecting a category of topics to inspect, you will see the following message appear in your menu box:

| Trying to open database on P17H ... |
| | |

Network Access

All of the NNS computers are networked allowing them to communicate with each other, other computers around the Laboratory, and the outside world. All of the VAXes support DECnet; most also have MultiNet from TGV, Inc., installed which supports the TCP/IP protocol for access to the Internet. The Internet is an international computer network linking educational institutions, research laboratories, governmental institutions, organizations and companies. The HPs are on the Internet.

Network Description and Location

The physical location of workstations on our Local Area Network (LAN) in Technical Area 53 may occasionally change depending on the group's needs. The following table was current as of publication time.

<u>System Name</u>	<u>Description</u>	<u>Operating System</u>	<u>Location Bldg-Room</u>
P17A	VAXstation II/GPX	VMS5.4	MPF573
P17B	VAXstation II/GPX	VMS5.4	MPF7-106
P17C	VAXstation II/GPX	VMS5.4	MPF7-104
P17D	VAXstation II/GPX	VMS5.4	MPF7-102
P17E	VAXstation II/GPX	VMS5.4	MPF29-100
P17F	VAXstation II/GPX	VMS5.4	MPF7-112B
P17G	VAXstation II/GPX	VMS5.4	MPF7-103
P17H	VAXstation 3200	VMS5.4	MPF7-105
P17I	VAXstation 3200	VMS5.4	MPF7-104
P17J	VAXstation 3200	VMS5.4	MPF7-112A
P17K	MicroVAX 3200	VMS5.4	MPF7-106
P17L	VAXstation 3100	VMS5.4	MPF7-106
P17M	VAXstation 4000/60	VMS5.5	MPF407-105
P17N	VAXstation 4000/90	VMS5.5	MPF407-105
THREX	VAXstation 2000	VMS5.4	MPF7-103
PEGG	MicroVAX II	VMS4.7	MPF7-103
P15	MicroVAX II	VMS5.4	MPF880
P17AA	VAXstation II/GPX	VMS4.7	MPF7-105
P17UA	HP 735	HP-UX9.1	MPF407-105
P17UB	HP 730	HP-UX9.1	MPF407-105

Network Addresses

DECnet Hostname/address Internet Hostname/address

Data Analysis Nodes:

NNS	53.500	54772	NNS.LANL.GOV	(cluster alias)
P17H	53.508	54780	P17H.NNS.LANL.GOV	128.165.51.8
P17M	53.513	54785	P17M.NNS.LANL.GOV	128.165.51.13
P17N	53.514	54786	P17N.NNS.LANL.GOV	128.165.51.14
			p17ua.nns.lanl.gov	128.165.51.32
			p17ub.nns.lanl.gov	128.165.51.33

Data Acquisition Nodes:

P17A	53.501	54773	P17A.NNS.LANL.GOV	128.165.51.1
P17B	53.502	54774	P17B.NNS.LANL.GOV	128.165.51.2
P17C	53.503	54775	P17C.NNS.LANL.GOV	128.165.51.3
P17D	53.504	54776	P17D.NNS.LANL.GOV	128.165.51.4
P17E	53.505	54777	P17E.NNS.LANL.GOV	128.165.51.5
P17F	53.506	54778	P17F.NNS.LANL.GOV	128.165.51.6
P17G	53.507	54779	P17G.NNS.LANL.GOV	128.165.51.7
P17I	53.509	54781	P17I.NNS.LANL.GOV	128.165.51.9
P17J	53.510	54782	P17J.NNS.LANL.GOV	128.165.51.10
P17K	53.511	54783	P17K.NNS.LANL.GOV	128.165.51.11
P17L	53.512	54784	P17L.NNS.LANL.GOV	128.165.51.12
THREX	53.516	54788	none	none
PEGG	53.517	54789	none	none
P15	53.518	54790	P15.NNS.LANL.GOV	128.165.51.62
P17AA	53.519	54791	P17AA.NNS.LANL.GOV	128.165.51.19

Via DECnet or Internet

To reach DECnet hosts from other DECnet hosts, type

```
$ SET HOST DECnet_hostname  
e.g. SET HOST NNS
```

or if the host has not been defined in your host's data base, type

```
$ SET HOST DECnet_address  
e.g. SET HOST 54772
```

To reach Internet hosts from other Internet hosts, type

Note The hostname may be case sensitive.

```
$ telnet Internet_hostname  
e.g. telnet p17ua.nns.lanl.gov  
or telnet p17ua (Locally)
```

or

```
$ telnet Internet_address  
e.g. telnet 128.165.51.31
```

Using Terminal Servers

A number of terminal servers around the Laboratory enable communications between terminals (or terminal emulation packages such as EM4105 or VersaTerm-Pro) and computers. Most terminal servers are set up to communicate at 9600 baud, 8 bits, no parity, one stop bit, XON/XOFF so check your emulation software if necessary.

Following is an example of how to communicate via a terminal server to the VAXcluster machines at NNS.

Press <CR> two or three times to get the terminal server prompt.

(Server identification appears)

Enter Username> (*Enter your name or initials*)

Local>

At this point you have logged on to the terminal server and can type HELP for a listing of additional server commands, or SHOW SERVICES for a listing of available services. To connect to a service, type CONNECT *servicename*.

Local> C NNS (This connects you to P17H or P17M)

or

Local> C P17H (This connects you to P17H)

At this point you will establish a connection with a host and will be asked for the host's login information.

(Host's identification appears.)

Username: (*Enter your username*)

Password: (*Enter your password*)

After logging off of the host you will again see the terminal server prompt and should log off of the server.

Local> LO

(Disconnect from terminal server. Also hangs up phone when using a dialup line.)

Dialup Lines

These lines will connect you to modems on the terminal servers which can access the P17 VAXes. The 2400 baud lines can also be used at 1200 or 300 baud. Always try dialing the highlighted numbers first; the line should switch automatically to the next number in the group if the first is busy. Dialup lines are set at 8 bits, no parity, 1 stop bit, XON/XOFF. After dialing the number, wait until a carrier tone is obtained or a CONNECT message appears on your screen, then hit <CR> rapidly two or three times to get the terminal server login prompt.

It is extremely important to remember to log off of the computer *and* the terminal server before hanging up your phone connection. If you do not log out but hang up (or lose your phone connection) you leave the connection open to other dialup users and possible misuse of your computer account. If you lose your connection, try dialing back in immediately to log yourself out completely.

Note <i>Use the 9600 baud lines only if you have a 9600 baud modem.</i>
--

<u>Phone Number</u>	<u>Baud rate</u>
665-3476 , (3477, 3478*)	9600, 2400*
667-1665 , (1666, 1667, 1668)	9600
667-9500 , (1051, 1112, 1325, 1511)	2400
667-6920 , (1657, 1658, 1659, 1660, 1662, 9289, 1664)	2400

These last two lines are connected to Hayes Half-Duplex modems – they will not work unless you also have a Hayes Half-Duplex modem at the other end.

665-1818	9600
665-0211	9600

ICN Access

ICN Workstation Software which allows access to the Central Computing Facility (CCF) from our hosts is installed on all NNS workstations. To use this software, you must have a valid password on the ICN. ICN USER VALIDATION applications can be obtained at the group office.

Note *The ICN charges for connect time, storing files (including those on CFS), keeping directories, using CPU time, etc. These charges can add up quickly. For example, a one-time per month flat rate of \$119 is charged to each ICN user whether the user accesses the ICN that month or not. Consider other alternatives before using the ICN.*

Connecting to the ICN

All ICN hosts in the open security partition are on the Internet so you can connect to them from any NNS host by typing `telnet hostname`, but it may be simpler to first run `icnauthorize` and then use the `icn hostname` command.

To avoid having to enter z-number, security level, and charge code each time you run `icnauthorize`, copy the file called `.icnrc` to your home directory and modify it to reflect your z-number, security level and charge code.

On VMS hosts

```
copy cdiv_dir:.icnrc [your_directory]
```

on HP-UX hosts

```
cp /usr/local/bin/.icnrc /your_directory
```

When the file has been modified, type `icnauth` and supply your ICN password. To set up an account on any CCF host, type `focus register` on an NNS host after running `icnauth` and follow the on-screen instructions. To connect to an ICN host, type `icn hostname`. To use CFS, type `cfs`.

CCF Hosts in the Open Partition

*Use the Greek name with `telnet`, letter with `icn`.

<u>Hostname</u>	<u>Description</u>	<u>Operating System</u>
alpha or a*	CRAY X-MP/416	UNICOS
rho or r*	CRAY Y-MP8/8-64	UNICOS
beta	VAX 6320	ULTRIX
CCVAX	VAX 8600	VMS
OFVAX	VAX 8600	VMS
p	VAX 8600	ULTRIX

ICN Dialup Access

Phone Number	Baud Rate	Type of Access
667-9020	2400, 1200, 300	Micom
667-9021	2400, 1200, 300	Micom
667-9022	9600	Micom
667-9023	9600	Micom
667-9024	9600, 2400, 1200, 300	TIG
667-9025	9600, 2400, 1200, 300	TIG

Micom lines: access hosts by typing `hostname`

TIG (Terminal Internet Gateway): access hosts by typing `telnet hostname`

Network File Transfer

VMS Copy (VAX to VAX)

"Pulling" a file off a remote host is the preferred method. If the file is world readable then simply type

```
$ COPY REMOTE_HOST::DISK:[DIR]FILE.EXT *.*
```

to copy the file into your directory on the local host, i.e., the host you are logged into. If the file protection is not set for world read, then you must include a username and password. This is a possible security risk, so avoid using this if at all possible; ask a system manager for alternative methods. If you must use this method, type

```
$ COPY REMOTE_HOST" user password"::DISK:: [DIR]FILE.EXT
*.*
```

"Pushing" a file from a local host to a remote host is not recommended due to file protection and/or ownership problems.

FTP

FTP, the Internet standard File Transfer Program, is available on all NNS computers. FTP allows you not only to transfer files between a local and remote host, but also allows you to list files in a directory, change directories, and delete or rename files. The command syntax may be slightly different for FTP implemented on different machines, but normally a username and password is required which gives you access to your home directory on the remote host. Some hosts have a special guest account and directory that can be accessed by users who do not have an account on that host. The username for this account is "anonymous" and, as a courtesy, you are expected to enter your remote username and hostname as the password, i.e., `username@nns.lanl.gov`. When you invoke FTP, you do not actually log in interactively; instead, a server process is created. Some of the commonly used commands are listed below.

```
$ FTP hostname
```

(connection message appears)

```
FTP> login username
```

```
password: password
```

```
FTP> ls or dir
```

List files in the directory.

```
FTP> cd remotedir
```

Change to another directory.

```
FTP> pwd
```

Show name of the directory.

```
FTP> get remotefile localfile Copy the remotefile to the local host.
```

```
FTP> put localfile remotefile Copy the localfile to the remote host.
```

The commands `mget` and `mput` allow you to copy multiple files, for example

```
FTP> mget file1, file2 *
```

Copy with the same name.

```
FTP> bye  
host.
```

Close session with the remote

```
FTP> open hostname
```

Open session with a remote host.

```
FTP> quit
```

Stop the ftp server process.

Kermit

Kermit, the remote file transfer program, is available on all NNS computers – VAXes and HPs. Kermit is useful for transferring files to and from the host computer if you are logged in over a modem from your PC or Macintosh. See your terminal emulation (EM4105, VersaTerm PRO, etc.) documentation for help. To use Kermit, you must first log in to the host and start the Kermit server. To invoke and start the Kermit server on the host computer, just type `kermit` at the system prompt and enter `server`. Two sample sessions with a PC using EM4105 follow. Other Kermit implementations may be slightly different.

VAX to PC File Transfer

Login to the VAX using EM4105.

```
$ KERMIT                !Run Kermit on the VAX.
Kermit-32>  SERVER      !Start the server.
ALT K                !Escape back to the PC and run Kermit.
EM-KERMIT> GET FILE.EXT !Get file from VAX.
(Kermit displays status of ongoing transfer.)
EM-KERMIT> BYE        !Disconnect from VAX, return to DOS.
```

NOTE *You are still logged on to the terminal server.*

```
C:\> EM                !Return to emulation mode.
Local> lo              ! Log off the terminal server.
```

PC to VAX File Transfer

Login to the VAX using EM4105.

```
$ KERMIT                !Run Kermit on the VAX.
Kermit-32>  SERVER      !Start the server.
ALT K                !Escape back to the PC and run Kermit.
EM-KERMIT> SEND FILE.EXT !Get file from VAX.
(Kermit displays status of ongoing transfer.)
EM-KERMIT> BYE        !Disconnect from VAX, return to DOS.
```

NOTE *You are still logged on to the terminal server.*

```
C:\> EM                !Return to emulation mode.
Local> lo              ! Log off the terminal server.
```

Electronic Mail

Electronic mail, or E-mail, allows you to communicate with other users on your host system or on remote hosts. The mail utilities provided with VMS and HP-UX are similar in that they both allow you to send and receive messages, file, forward, delete, reply to, and print messages that you have received.

VMS Mail

VMS Mail allows you to send and receive messages on any VAX connected to DECnet. Your personal VMS mail can be accessed from any node on the NNS VAXcluster, i.e. P17A - P17N, because only one disk is used for mail. Mail can be sent to you from remote locations at the following addresses:

<code>NNS::username</code>	DECnet
<code>username@nns.lanl.gov</code>	Internet

The NNS VAXcluster has MultiNet software installed which includes the Simple Mail Transfer Protocol (SMTP) making it possible to send and receive messages on the Internet. Machine P17H is also a POP (Post Office Protocol) server allowing it to store and forward mail to PCs or Macs that have mail software installed. To invoke the VMS Mail Utility type `MAIL` at the system prompt. Online help is available from within the utility by typing `HELP` at the prompt.

Reading Mail

The system notifies you of new mail. To read a new message:

```
$ MAIL
```

You have 1 new message.

```
MAIL> <CR>           !Hitting RETURN is equivalent to READ
```

Mail message appears. Whenever you read a mail message you have several options of how to handle the current message. Some of the options are:

```
MAIL> FORWARD           !Send a copy to another user.
MAIL> REPLY              !Reply to the current message.
MAIL> EXTRACT filename  !Save as a file in your account
MAIL> MOVE folder       !Move message into another folder
                        !Move message into another folder
                        !(folder is created if it doesn't exist).
MAIL> SELECT MAIL       !Select allows you to move between
                        !folders. If you have just read a new
                        !message and want to reread an old
                        !message, type this.

MAIL> DIR                !List all messages in current folder.
MAIL> DELETE            !Deletes the message you are
                        !reading.

MAIL> CTRL/Z or EXIT    !Leave Mail and save messages in
                        !MAIL folder.
```

Creating a MAIL Directory

When you receive mail messages, they are usually written to files named MAIL\$XXXXXXXXXX.MAI located in your home directory. *If you delete these files, you will lose all these messages and possibly corrupt your mail system.* If you do not want to see these file names displayed in your home directory, type

```
MAIL> SET MAIL_DIRECTORY [.MAIL]
```

This command creates a subdirectory and moves all your mail files into that subdirectory.

Customizing Mail

Invoking a text editor while in MAIL makes it easier to compose your message. To have this be the default case, put the following line in your login.com file:

```
$ MAIL := MAIL/EDIT=(SEND,REPLY,FORWARD)
```

The default editor for VMS mail is EDT. To change this specify the following from within the Mail Utility.

```
MAIL> SET EDITOR editor_name
```

Normally, when you send VMS mail to someone, all they see is your VMS username which may be a nickname, common name, or initials. To better identify yourself, you can set a "personal name" which might contain your real name, group, and phone number. To set this use the following command.

```
MAIL> SET PERSONAL_NAME "name, group, phone"
```

Defining aliases in your login.com file is especially useful for long addresses you frequently use. You can then send mail to the alias name. Some examples are (note the double quotes):

```
$ DEFINE/NOLOG PRES "SMTP%" "PRESIDENT@WHITEHOUSE.GOV" " "
$ DEFINE/NOLOG VICE -
    "SMTP%" "VICE.PRESIDENT@WHITEHOUSE.GOV" " "
$ DEFINE/NOLOG SIG "SMTP%" "hecker@lanl.gov" " "
```

Sending Mail

If you have already created a file with a mail message, you can send the message directly from the DCL prompt with the command

```
$ MAIL/SUBJECT="Optional_subject" file.txt mail_address
```

or you can type the text of a message from within the MAIL utility. If you choose this method, you may want to set up your editor first. See *Customizing Mail* for how to do this.

```

$ MAIL
MAIL> SEND
To: mail_address
Subject: message_subject           !Optional
Enter your message.
CTRL/Z                               !Send the message.
CTRL/C                               !Abort the message.
MAIL> CTRL/Z or EXIT                 !Leave the Mail utility.
```

Sending Mail to a Distribution List

If you need to send mail periodically to a number of users, i.e., all members of your experimental group, you can create a distribution list which is a text file that resides in your home directory with the default extension of *.dis* containing all the mail addresses. For example:

```

!EXPERTS.DIS
MYNAME
YOURNAME
DAC::COLLABORATOR
SMTP%"einstein@lampf.lanl.gov"
SMTP%"PRESIDENT@WHITEHOUSE.GOV"
SMTP%"hecker@lanl.gov"
```

You can then send the file MEMO.TXT to the distribution list with the command

```
$ MAIL/SUBJECT="Meeting" MEMO.TXT @EXPERTS
```

or from within the mail utility with

```
MAIL> SEND MEMO.TXT
To:    @EXPERTS
Subj:  Meeting
```

Forwarding Your Mail

You can set up your mail system to forward all your messages to another username or host computer. This is useful if you prefer to have your mail sent to your home institution when you are no longer visiting at LANL, or if you have been receiving mail on another host (the DAC, for example) and would now like it sent to NNS. It is not necessary to set a forwarding address from one host on the NNS VAXcluster to another host on the NNS VAXcluster, i.e., P17C to P17I. All mail sent to this cluster can be read on any NNS cluster machine. To set a forwarding address use one of the following examples.

```
MAIL> SET FORWARD hostname::username
```

to forward mail to another DECnet host or

```
MAIL> SET FORWARD "SMTP%" "username@hostname.domain" "
```

to forward mail to an Internet host. Note the extra quotes.

Once you have set a forwarding address, any new mail you receive will be sent to that address. If you would still like to read your old mail at your new address, first copy your old mail to your new address, then select that file. For example:

```
$ COPY DAC::DISK: [DIRECTORY.MAIL]MAIL.MAI -
  [.MAIL]DAC_MAIL.MAI
MAIL> SET FILE DAC_MAIL.MAI
```

HP-UX Mail

HP-UX has three different mailers installed: **elm**, **mailx** and **mail**. All allow you to communicate with users on the local system and remote systems on the Internet.

Note You should decide which mailer you prefer and use that one consistently to avoid problems with the system which may corrupt your mail files.

Probably the easiest mailer to use is **elm**; therefore, all examples below will be for the **elm** mail utility. If you are more familiar with another mailer, feel free to use that one. In any case, your mail address on the HP will have the form:

`username@p17ua.nns.lanl.gov`

Reading or Sending Mail

To start the **elm** mailer type `elm` at the system prompt. A screen similar to the one below will appear.

Mailbox is 'usr/mail/username' with 1 message [Elm revision 70.85]

N 1 May 17 Bill Clinton (14) Visit to Los Alamos

You can use any of the following commands by pressing the first character;
D)elete or U)ndelete mail, M)ail a message, R)eply or F)orward mail, Q)uit
To read a message, press <return>, J = move down, k = move up, ? = help

Command:

To read the current message, (the one highlighted or indicated by a `>`), press `<return>`. If you choose Mail, Reply, or Forward additional prompts appear. For example, if you want to mail (send) a message, you will be prompted for the mail address of the recipient and the subject of the message. Then **elm** starts the **vi** editor to allow you to type your message.

Command: m

Send the message to: *mail_address*

Subject of message: *subject* or <cr>

Copies To: *mail_address* or <cr>

(You are now in vi unless you have customized elm. Type i to enter insert mode, type your message, then exit the vi editor and save your message by pressing <esc> and then typing :wq. After you exit the editor, you will see a message similar to the one below appear on your screen.)

Please choose one of the following options by the first character:

E)dit message, edit H)eaders, S)end it, or F)orget it.

Enter s to mail your message. It may take a few minutes, but if the mailer was successful, the message **mail sent!** will appear on your screen.

Mail can also be sent directly from the system prompt by first creating a text file containing your message, then typing

```
% elm -s "subject" mail_address < filename
```

Creating a .elm Directory

Every time you start the elm mailer, it refers to a ~/.elm/elmrc file for how to configure your version of elm. If this directory and file do not exist in your home directory, you should create them by typing

```
% mkdir .elm
```

```
% cd .elm
```

```
% vi elmrc
```

(Customizing elm can be done from within the mailer. Just create the file for now.)

```
<esc>
```

```
:wq
```

While you are in the .elm directory, you can also set up an "alias" file which makes mailing to a group of users easier, and allows you to use shortened mailing addresses. Type `man elmalias` for more information.

An example elmalias file follows.

```
% vi aliases.text
#mail aliases have the form:
#alias = Real Name = username@address
myname = Jane Doe = myname@p17ua.nns.lanl.gov
yourname = Joe Smith = yourname@nns.lanl.gov
#you can use the alias al to send a message to Einstein
al = Al Einstein = collaborator@lampf.lanl.gov
clinton = Bill Clinton = PRESIDENT@WHITEHOUSE.GOV
#you can use the alias experts to send the same message
to all the above
experts = Our Experts = myname, yourname, al, clinton
<esc>
:wq
```

After creating or modifying the file, type

```
% elmalias
```

to install a new set of personal aliases.

Customizing Elm

The elm mailer can be customized to make it more convenient for you to use. Options like which editor to use and which printer to send mail to can be changed from within elm by bringing up the options menu. These options are written to your `/.elm/elmrc` file. See **Creating a .elm Directory** if you have not yet created this file. From within elm, typing `o` at the **Command:** prompt will bring up the elm Options screen.

Forwarding Your Mail

If you prefer to receive mail on a computer other than a specific NNS HP, you can have your mail forwarded to another address. Because the HPs are not clustered, this must be done on each HP. To create a forwarding address, edit the file

```
/usr/mail/username
```

and insert as the very first line

```
Forward to username@hostname.domain
```

If you would like to receive all your mail on the VAXcluster, you would enter the following

```
Forward to username@nns.lanl.gov
```

Disk Drives

User Disk Space Allocation

Disk quotas are not currently enabled. Therefore, users need to monitor their own disk space usage, and are encouraged to move files to tape or other storage whenever possible.

VMS

VMS keeps track of the number of "blocks" on a disk as opposed to bytes. One block equals 512 bytes. Two useful local commands for checking on the amount of disk space available are:

```
$ FREE_SPACE
```

which lists the free space left on the disks and

```
$ DISKUSER
```

which lists the top disk space users as well as the number of free blocks left on the disks. If you require more disk space than is currently available, try to negotiate with one of the top disk space users to free some space.

To check on your own disk space usage type

```
$ DIR/SIZE/TOTAL. [...]
```

from your home directory on the user or scratch disk.

Expiration dates have been set for all files residing on the scratch disks. Files not accessed or modified will be deleted after 3 days. This means any files created on the scratch disks on May 12 at 3 p.m. expire on MAY 15 at 3 p.m. and will be automatically deleted by the system that night.

<p>Note The scratch disks are not backed up. When a file is deleted by the system, there is no way to restore it for you.</p>
--

Use the scratch disks only for temporary storage of large files needed during analysis; store other files (program files, command files, etc.) on the user disk. If you are concerned about saving files residing on the scratch disks you can

- Check the file's expiration date by using the DCL command

```
$ DIR/FULL filename.ext
```

- Backup the file to tape and restore it to the disk at a later time. The VMS BACKUP utility preserves the original file expiration date. **Steps must be taken to reset the expiration date such as modifying or renaming the file after restoring it from backup. Automatic renaming of scratch files to avoid deletion is not permitted.**

HP-UX

To see if disks are mounted and the total disk space usage, use the command:

```
% bdf
```

To check on your own disk space usage use

```
% du | grep -v vue
```

which displays the number of blocks (512 bytes = 1 block) used in each directory.

Disk Backups

Users are responsible for backing up their own data. The system managers perform full disk backups only two to three times a year - never during the LAMPF run cycle when performing the full disk backups would interfere with data acquisition. Although an incremental backup of the VAXcluster runs nightly, this backup does not include xdata.sec files or files with the following extensions: .dat, .hsv, .evt, .obj, .map, .mem, .tap, .log.

Backups are *not* regularly performed on the HPs. Occasionally, the system managers will perform a backup to enable recovery from a catastrophic failure, but no incremental backups are performed. Your personal backup options are

1. CFS if you are a validated ICN user. CFS software is implemented.
2. Using ftp to copy the files to another computer.
3. Archiving the files to 4 mm DAT tape.

Tape Drives

All of the NNS computers have a 4 mm Hewlett Packard 35480A DDS-DC (Digital Data Storage-Data Compressed) tape drive installed, and most VAXes have an 8 mm Exabyte 8200 drive installed as well. At least one computer has two 4 mm drives and one has two 8 mm drives for making tape copies. Send mail to SYSTEM for the location. Half-inch (9-track) and TK50 tape drives are no longer in use at NNS. The 4 mm drives appear to be a new industry standard, and are the drives recommended for use at NNS. These drives have high speed search capabilities, do data compression, and use a different tape head/transport technology which greatly reduces tape wear.

Tape Media

Experimenters are responsible for determining their needs and ordering tapes. Because tapes are less expensive in large quantities, NNS group members will be notified when an order is about to be placed by the computer staff so that orders can be combined.

Tape cartridges should be kept away from magnetic fields and stored at room temperature in their original plastic boxes. **Under no circumstances should you touch either the magnetic tape surface or the cartridge drive capstan.** If possible, list the tape to make sure the data you think you have on it is readable before deleting the data from disk.

Note *Always make a copy of your tape and store it in a separate location.*

4 mm Tape Cartridges

The 60 m tape cartridge can hold 1.3 GB to 6 GB of data, depending on the file type and data compression ratio. Data acquisition files tend to have a low compression ratio so you may get (on average) 1.5 to 2.0 GB on a 60 m tape. The 90 m tape cartridge holds 2 GB to 9 GB. For most applications, the shorter, less expensive tapes are adequate. Only Digital Data Storage (DDS) format tapes should be used. Use of other tapes may damage the drive. Among other vendors, these tapes are available from

Creative Consultants

4410-A Hawkins NE

Albuquerque, NM 87109

(505) 345-7222 Contact: Don Wood

Order Hewlett Packard (or other DDS format) 4 mm DDS Cartridges

HP92283A (60 m), \$15 each

or

HP92283B (90 m), \$20 each

8 mm Tape Cartridges

Anyone using the 8 mm tape drives for data acquisition storage should only use the Exabyte EXATAPE Data Cartridge. This tape is specifically designed and certified for data storage. Typically, the 54M (60 m) holds about 1.2 GB, and the 112M (90 m) holds about 2.5 GB. These cassettes are available from Creative Consultants and other vendors. The 112M costs about \$20 each.

Slightly lower cost (and probably comparable quality) 8 mm tape cartridges for non-critical applications, such as copies, are available from:

The Tape Company

810 Sivert Suite C

Woodale IL 60191

(708) 595-3113

Order SONY (or other brand) 8 mm Data Cassette

QG-54M (60 m), \$11.06 each

or

QG-112M (90 m), \$14.30 each

VMS Tape Backup

Backing up to tape to store and save files is recommended over using the COPY command because it is generally a faster, more reliable method of storing data. The COPY command is useful when copying from tape to tape. Type HELP BACKUP for more information.

VMS Backup Examples

NOTE NEVER TYPE <CTRL-Y> OR <CTRL-C> during any 8 mm tape operation! Doing so will possibly hang your process and the tape drive. Only a reboot of the computer will correct this situation.

Save Operation

```
$ INITIALIZE MUA1: DAT93
```

CAUTION INITIALIZE totally cleans a tape of all data and should only be used on new tapes or tapes you want to overwrite.

```
$ MOUNT/FOREIGN MUA1:
$ BACKUP/NOCRC/NOASSIST/BLOCK=16384/LABEL=DAT93 -
_ $ USER_DISK: [ONLINE1.DATA] *.EVT; * MUA1:MYDATA.BCK
$ DISMOUNT MUA1:
```

INITIALIZE labels a tape as DAT93. The label can be no longer than six characters. Initializing a tape takes about 30 seconds on a 4 mm drive and over 2 minutes on an 8 mm drive. MOUNT/FOREIGN mounts the tape in drive MUA1. The backup command backs up all files with the .evt extension in the [ONLINE1.DATA] subdirectory to the tape drive named MUA1: in a saveset called MYDATA.BCK. DISMOUNT MUA1: dismounts and ejects the tape.

An explanation of the qualifiers used in the previous `BACKUP` command follows.

`/NOCRC` disables cyclical redundancy checking which slows the CPU and drives down and is unnecessary because the drives and controllers already implement CRC in the hardware.

`/NOASSIST` displays backup error messages at your terminal instead of an operator's terminal.

`/BLOCK=16384` reduces start/stop operations and in general, more data can be put on one tape than with smaller block sizes.

`/LABEL=DAT93` verifies that the correct tape has been inserted by checking against the volume label. This option can be overridden with the `/IGNORE=LABEL` qualifier.

A special command has been defined at NNS for writing backup save sets: `NBACKUP` (which may be abbreviated `NBACK` or `NB`). This local command is equivalent to the command

```
BACKUP/NOCRC/NOASSIST/BLOCK=16384/IGNORE=LABEL
```

Note that any qualifiers must be placed after the input and/or output device, not after `NBACKUP`. The backup command shown in the example above could be abbreviated by typing

```
$ NB USER_DISK: [ONLINE1.DATA] *.EVT; * MUA1:MYDATA.BCK
```

Selected files can be backed up by separating them with a comma as in the following example.

```
$ NB USER_DISK: [ONLINE1.DATA] RUN001.EVT, RUN003.EVT -  
_ $ MUA1:MYDATA.BCK
```

Restore Operation

Make sure that the tape has been write protected before inserting it into the tape drive.

NOTE Write protection switches are opposite of each other for 8 mm and 4 mm tapes.

```

$ MOUNT/ FOR MUA1 :
$ NB MUA1 : MYDATA . BCK / SELECT = RUN001 . EVT ; 4 -
__$ [ MYDIR . ANALYSIS ]
$ DISM / NOUHL0AD MUA1 :

```

This mounts the tape from the previous example and restores only the file *RUN001.EVT;4* from the saveset *MYDATA.BCK* to *[MYDIR.ANALYSIS]*. Then the tape is dismounted but not ejected from the tape drive in case it needs to be remounted later, for example from a remote terminal to backup another file.

Note Experience has shown that large event data files are best backed up to tape using the *NBACKUP* command executed as a batch job, i.e. at low priority.

List Operation

It is good practice to list your backup tape to make sure that the data is readable. The */LIST* qualifier lists the contents (files, sizes, attributes of the saveset) to a file on disk or to the screen if no output file is specified. It also positions the tape to the end of the saveset *MYDATA.BCK* if */REWIND* is not specified. To list the contents of the tape to the screen, type

```
$ NB MUA1 : MYDATA . BCK / LIST
```

The following example will list the contents of the saveset *MYDATA.BCK* to the output file *[MYDIR]MYDATA.LIS*.

```
$ NB MUA1 : MYDATA . BCK / LIST = [ MYDIR ] MYDATA . LIS
```

VMS Copy Example

Make sure your data tape is write protected. You will need to initialize another tape to receive the copy. Remember that the `initialize` command destroys all data that may exist on a tape. The following example makes a copy of the tape in drive `MUA0:` to the tape in drive `MUA1:`. When mounting a tape for a `COPY` operation, the tape label must be specified. The following example copies everything on `MUA0:` to `MUA1:`.

```
$ MOUNT/BLOCK=16384 MUA0: LABEL
$ IN^T MUA1: LABEL
$ MOUNT/BLOCK=16384 MUA1: LABEL
$ COPY MUA0: *.* MUA1: *.*
$ DISM MUA0:
$ DISM MUA1:
```

To write a directory listing including the date and size of everything on the tape in `MUA0:` to the file `MYTAPE.LIS` in the default directory, follow the next example. This also positions the tape to after the last file on the tape.

```
$ MOUNT MUA0: LABEL
$ DIR/DATE/SIZE/OUT=MYTAPE.LIS MUA0: *.*
```

HP-UX Tape Backup

GNU tar, the tape archiver available from the Free Software Foundation is installed on the HPs. The 4 mm tape drive is defined as `/dev/rmt/0m`, (rewind) or use `/dev/rmt/0mm` (no rewind) when you want to backup more than one file to the tape. There is no initialization or mounting of the tape so everything is written to the 'file' `/dev/rmt/0m`. The tar command has many options. Type `man tar` for more information or request a copy of the tar manual from a system manager. With this command there is some risk of overwriting data already on the tape, so it is suggested that unless you are very familiar with tar, just store one backup on one tape. The following command will backup your entire directory.

```
% gtar -cPvMzf /dev/rmt/0m /users/username
```

-c tells tar to create a new archive that contains the file(s) specified on the command line. If you don't specify files, all files in the current directory are used. If the archive file already exists, it is overwritten; the contents are lost.

-P tells tar to preserve the absolute pathname.

-v causes tar to be verbose about the actions it is taking. In other words, the files backed up will be listed to the screen.

-M causes tar to write a *multi-volume* header to the tape. If not enough room exists on the tape for your backup, tar will prompt you for another tape.

-z compresses the backup as it is written, and decompresses it as it is read.

-f is used to specify the file name of the archive tar works on.

Printers

A variety of printers is available on the NNS network. There are three DEC LN03+ laser printers, a QMS 860 that emulates PostScript, HPGL, and LN03+, a color PostScript Tektronix Phaser II, two HP LaserJets, and an Apple LaserWriter. If you are working on the console of the data acquisition VAXes, using the LN03+ printers is most convenient. Otherwise, output should generally be sent to the QMS 860. This printer is also available from the Macintosh Chooser as "QMS 860" and from the PCs on the network as "P17HQ_PS".

VMS Print Queues

QUEUE NAME	LOCATION	TYPE	EMULATION
WNR1\$PRINT	MPF-7, Room 100A	LN03+	Tektronix 4010/4014
WNR2\$PRINT	MPF-7, Room 100A	LN03+	VAX screen dumps only
P17HQ\$LN03	MPF-882, Room 107	LN03+	Tektronix 4010/4014
P17HQ\$PS	MPF-882, Room 107	QMS	PostScript, HPGL, LN03, Tektronix 4010/4014
PHASER\$PS	MPF-882, Room 107	TEK	PostScript
HPLASER	MPF-407, Room 105	HP	HP screen dumps

The command to view the status of a queue and any jobs in it is

```
$ SHOW QUEUE queuename
```

VMS Print Commands

Printing Files to LN03 Printers

Use the LN03 command to print Tektronix, LN03, or Text files to printers supporting this emulation. To print a standard text file to P17HQ\$LN03 type

```
$ LN03 I=filename.txt O=P17HQ
```

To print a Tektronix 4010/4014 graphics file type

```
$ LN03 I=filename.plt O=P17HQ F=G
```

To view other options associated with the LN03 command, type LN03 HELP.

Printing Files to PostScript Printers

Use the PS command to print a PostScript file to a PostScript printer. To print to P17HQ\$PS type

```
$ PS I=filename.ps O=P17HQ
```

The PS command has many options that may be viewed by typing PS HELP.

Printing Standard Text to the HPLaserJet

Use the normal VMS print command to send output to the HPLASER queue.

```
$ PRINT/QUE=HPLASER filename.lis
```

Printing Output from T_EX and L_AT_EX

You can print a DVI file to an LN03 laser printer using the DVILN3 command.

```
$ DVILN3 I=filename.dvi O=printername
```

To print a DVI file to a PostScript printer, first use the DVIPS command to produce a .ps file and then use the PS command to print the .ps file.

```
$ DVIPS filename.dvi
```

```
$ PS I=filename.ps
```

Printing a CGS Metafile

Programs such as MAPPER and DISSPLA can generate CGS metafiles. These metafiles are device independent and can be printed and viewed on a variety of devices. To view a metafile on a Tektronix 4010/4014 compatible terminal, use the PTEKT command.

```
$ PTEKT metafile
```

To print your metafile on an LN03 laser printer, use the PLN03 command.

```
$ PLN03 I=metafile O=printername
```

To view the other options supported by PLN03, type PLN03 HELP.

To print your metafile to a PostScript printer, first use the PPS command to create a PSDAT.DAT file.

```
$ PPS -I metafile
```

You will be prompted for information about the desired plot. Other options for this command are given if you type `PPS -HELP`. Then the `PSDAT.DAT` file can be printed using the `PS` command.

```
$ PS I=PSDAT.DAT O=printername
```

HP-UX Print Queues

The HP workstations can access the same printers listed above that the VAXes do but the queue names and print commands are different.

<u>QUEUENAME</u>	<u>VMS QUEUE</u>	<u>PRINT COMMAND</u>
sys_print	HPLASER	<i>lp filename</i>
ln03	P17HQ\$LN03	<i>lp -dln03 filename</i>
ps	P17HQ\$PS	<i>lp -dps filename</i>
phaser_ps	PHASER\$PS	<i>lp -dphaser filename</i>

The command to view the complete status of queues is

```
% lpstat -t
```

Screen dumps are possible on the HP workstations and the output is sent to the HP LaserJet attached to p17ua. To do a screen dump:

- ◆ Click and hold down the left mouse button on a blank part of the screen until the **Workspace Menu** appears.
- ◆ Slide the mouse to the **Print Screen...** then immediately to the **Select Window**.
- ◆ The mouse pointer will turn into an open cross "+". Move the + into the window you want to print and click once.

- ◆ Again display the Workspace Menu, Print Screen... and select Print Window.

Batch (Background) Processing

If you need to perform a computing task which requires more than 10 minutes of CPU time or for some other reason would like to perform a task non-interactively such as running large simulation codes, analyzing data, or backing up large amounts of data to tape, submit the job to a batch queue on the VAXes, or to the background on the HPs. Running a job non-interactively allows you to log out of all windows or a terminal and perform tasks during non-peak working hours. See also **XSYS Batch Processing** under **Data Acquisition Hints**.

VMS Batch Processing

Batch jobs are run by executing command procedures (see the *VMS General User's Guide on Writing and Using Command Procedures*) using the `SUBMIT` command. Once the command procedure is submitted it waits for previously submitted jobs in the same queue to finish executing. A process is then created that is much like an interactive session which first executes your login command procedure, and then executes the command procedure you submitted. All P-17 VAXes have the following batch queues. The queues are faster on P17M and should be used for jobs that are very CPU intensive.

Batch Queues

SYS\$BATCH

This queue has a low priority with unlimited CPU time. It is adequate for most applications where speed is not essential and must be used for long batch jobs. Two jobs will execute in this queue simultaneously. It is the default queue for the submit command.

FAST

This queue has a higher priority to allow a batch job to complete more quickly, but only allows 15 minutes of CPU time before terminating the job. It is designed to handle small jobs that need to be completed quickly. Only one job executes in this queue at a time. As a courtesy to other users, submit no more than two jobs to this queue at a time so that others can also have access.

SHORT

This queue has a medium priority with one hour CPU time. It is designed to handle jobs that are not too long but need to be completed in a timely manner. It has a job limit of one. Only one job should be submitted to this queue so that others can have access.

Submitting Batch Jobs

If you have a command file named `TEST.COM` in your current directory, you can submit it to the default batch queue (`SYS$BATCH`) using the command

```
$ SUBMIT TEST
```

or to the `FAST` queue using the command

```
$ SUBMIT/QUE=FAST TEST
```

The following might be displayed by the system after submitting the job.

Job TEST (queue FAST\$BATCH, entry 240) started on
P17H_FAST\$BATCH

If the batch queue was busy executing another user's job, you might see the following message.

Job TEST (queue FAST\$BATCH, entry 240)pending
pending status caused by queue busy

A log file, TEST.LOG is created in your login directory unless you specify otherwise. The log file can be displayed on your terminal during the batch job's execution to monitor the job's progress using the command

```
$ TYPE TEST.LOG
```

To examine the status of your batch job use the command

```
$ SHOW QUEUE/ALL FAST
```

You can stop a job from executing using the delete command with your entry number. You only have privilege to delete your own jobs, not other users' jobs.

```
$ DELETE/ENTRY=240 FAST
```

HP-UX

There are no real batch queues on the HP. You can submit scripts to run jobs in background mode using the `sub` command. Running jobs in background, or non-interactively, causes them to run at a slightly lower priority and allows you to log out of your session before the job completes. As a courtesy to other users, use the `sub` command during non-peak hours if you expect one large job or several small jobs to run more than 10 minutes or use more than 10 MB of memory. If you interactively use

```
% mcnp inp=inpxyz outp=outprob
```

to submit the job to background use

```
% sub mcnp inp=inpxyz outp=outprob
```

The sub command is equivalent to the UNIX string of commands `nohup nice time`. `nohup` means do not disconnect upon logout, `nice` reduces priority, and `time` provides system and real time upon completion. In addition, a log file containing the name of the script you submitted, for example `mcnp.log`, is created in your directory. The log file can be displayed on your terminal using

```
% cat mcnp.log
```

or

```
% more mcnp.log
```

Software

A variety of software is available at NNS for programming, processing graphics and text, data analysis and acquisition, etc. Most software packages come with their own online help and/or manuals.

Programming Languages

FORTTRAN is available on all NNS computers. Pascal and C are available on the VAXcluster. C is available on the HP workstations.

VMS

VMS requires that you first compile your program, then link the object code to produce an executable image. Many options are available. See the online help facility for the desired language, e.g. `HELP FORTRAN`, or check the manuals for additional information.

Compiling, Linking, and Running a FORTRAN Program Example

\$ FORT MYPROG.FOR !Produces MYPROG.OBJ file

\$ LINK MYPROG.OBJ !Produces MYPROG.EXE file

\$ RUN MYPROG !Executes MYPROG.EXE

Compiling, Linking, and Running a C Program Example

\$ CC MYPROG.C !Produces MYPROG.OBJ file

\$ LINK MYPROG.OBJ !Produces MYPROG.EXE file

\$ RUN MYPROG !Executes MYPROG.EXE

HP-UX

Refer to documentation on the compilers for help on the many options, or consult the online help (`man f77` or `man cc`). Unlike under VMS, there is no need to specifically link object code under HP-UX. A very important point to remember when compiling programs under UNIX is that UNIX does not support different file version numbers. If, for example, you compile `myprog.f` into `myprog`, the next time you compile `myprog.f`, `myprog` is overwritten unless you specify a different output name. If no output name is specified with the `-o` option, the compiler produces an executable image called `a.out` for FORTRAN, C, or Pascal code. The program can be executed by merely typing `a.out`.

Compiling, Linking, and Running a FORTRAN Program Example

A special command, `fort`, has been defined on the HPs to make compilation easier.

% `fort myprog` #Compiles and links `myprog.f`. Creates `myprog`.

% `myprog` #Executes `myprog`

The `fort` command is equivalent to to: `f77 -K -O -o myprog myprog.f`

- K keeps variables in subroutine from one call to next
- O gives level 2 optimization. There is a level 3, but we have noticed that sometimes it produces incorrect executables. Level 2 provides excellent optimization for all practical purposes.
- o produces object code with the file name `myprog`

Compiling, Linking, and Running a C Program Example

```
% cc -o myprog.c myprog #Compiles, links myprog.c. Creates
myprog
```

```
% myprog #Executes myprog
```

Graphics and Text Processing

CGS and CGSHIGH Graphics

CGS is a library of subroutines that provide graphics primitives for all C-Division supported operating environments and many graphics devices including Tektronix, X Windows, and PostScript. This library is installed on the VAXcluster. To use this library with a FORTRAN program, type

```
$ FOR/LIST myprog
```

```
$ LINK myprog,CGSFOR/LIB
```

```
$ RUN myprog
```

CGSHIGH is a library of high-level graphics subroutines based on the CGS Graphics Library. It is also installed on the VAXcluster. To use this library with a FORTRAN program, type

```
$ FOR/LIST myprog
```

```
$ LINK myprog,CGSHIGH/LIB,CGSFOR/LIB
```

```
$ RUN myprog
```

Documentation for both libraries may be ordered through C-Division.

DISSPLA

DISSPLA V11.0 and CA-GKS V2.0 are installed on P171. DISSPLA is a multipurpose interconnected subroutine library used for plotting graphs. To link your program to DISSPLA, type

```
$ LINK myprog1,myprog2,..., 'DISSPLA'
```

Additional information on how to use the software is in the file DNOTES.DOC which can be displayed on your terminal by typing

```
$ TYPE/PAGE DIS110DATA:DNOTES.DOC
```

or sent to the printer of your choice. Online help for the DISSPLA package is available through the VMS online help facility by typing HELP CA-DISSPLA on P171.

MAPPER

This software processes a user-written input file to display on a terminal or write to a CGS metafile. The metafile can be processed to be output to a number of devices. To use, type

```
$ MAPPER I=input_file !Displays on Tek 4010 terminal
```

```
$ MAPPER I=input_file D=META !Creates a metafile
```

"*input_file*" is the user-written input file. The output metafile is named "PLOT.". See the MAPPER manuals available through C-Division for more information.

PTEKT

You can display CGS metafiles, such as those generated with DISSPLA and MAPPER, on Tektronix 4010 series compatible terminals with PTEKT. PTEKT is still available on the VAXcluster, but is no longer supported by C-Division. To use, type

```
$ PTEKT metafile
```

PGPLOT

PGPLOT is a 2-D graphics package that is relatively simple to use, supports color output, and has some nice fonts. It is installed on the VAXcluster and on the HPs. For details, obtain the *PGPLOT Graphics Subroutine Library* manual from a system manager. For a demonstration, type

```
$ PGDEMO1          !On a VAX
```

```
% PGDEMO1          #On an HP
```

To compile and link your program with PGPLOT

```
$ FOR program.for                                !VAX
```

```
$ LINK program,PGPLOT_DIR:GRPSHR/LIB             !VAX
```

```
% f77 -c program program.f -lpgplot             #HP
```

PGPLOT supports a number of graphical output devices. When your program is run, PGPLOT will request the code for the device type desired. A few of the output devices available are listed below.

/WS4 Output will be displayed on a VAXstation

/TEK4010 Output will be displayed on a Tektronix 4010 terminal or emulation window

TFILE Output will go to a disk file with the default filename `PGPLOT.TFPLOT`. This file can then be printed on an LN03 printer using the command

```
LN03 I=PGPLOT.TFPLOT F=G  
O=quer:ame
```

/PS output will go to a disk file with the default filename `PGPLOT.PS`. This file can then be printed on a PostScript printer using the command

```
PS I=PGPLOT.PS O=quername
```

/TK4100 Output can be displayed on a Tektronix 4105 color window.

/HPGL Output will go to a disk file with the default filename `PGPLOT.HPGL`. This file can be copied to a PC and sent to an HP7475A pen plotter. If the HP7475A is attached to a com port on your PC, the com port number should be set up with the following command

```
C> MODE COM2 9600,E,7,1
```

and then the file can be plotted with the command

```
C> TYPE PGPLOT.HPGL > COM2
```

TEX

TEX is a text formatting utility which can produce high quality reports, papers, etc. Manuals for users are available from C-Division. To process a TEX file on the VAXcluster to produce a device independent output file, *filename.dvi*, type

```
$ TEX filename.tex
```

This file can then be previewed on a VAXstation running DECwindows by typing

```
$ XDVI filename
```

or sent to a printer using the DVILN3 or DVIPS command.

TRIUMF Graphics: OPDATA, PLOTDATA, EDGR

These graphics packages developed at TRIUMF are available on the VAXcluster. Documentation is available from a system manager. All of these packages need to know your terminal type and the plotter type on which you want graphics hardcopy output. The following files can be copied into your directory and modified if necessary.

```
SCRH: [TRIUMF.PLOTDATA] INITFILE.PCOM
```

```
SCRH: [TRIUMF.PLOTDATA] INITFILE.OCOM
```

Then modify your login.com file to include the following lines

```
$ DEFINE PLOTDATA$INIT disk:[directory]INITFILE.PCOM
```

```
$ DEFINE OPDATA$INIT disk:[directory] INITFILE.OCOM
```

Online help can be obtained for the packages by typing HELP at the prompt. For example

```
$ PLOTDATA
```

```
PLOTDATA: HELP
```

SPEAKEASY

Speakeasy, a graphics/data analysis package, is available on the VAXcluster. Contact Steve Sterbenz, P-15, 667-7249 for more information.

Data Analysis and Simulation

CERN Software

A few of the CERN data analysis and simulation routines are available on the HPs under the /users/cern directory.

LAHET Code System (LCS)

The HP workstations have been set up primarily for running large simulation codes. The LAHET Code System includes the Monte Carlo Neutron and Photon Program (MCNP Version 4XG,) which is useful for detector design, shielding, and other simulations, EGS4 and SUPERHET. Other parts of the code are for Monte Carlo calculations for higher energy particles. For photon transport, use EGS4 which is part of the SUPERHET package and uses the MCNP geomctry package. For questions regarding this code, contact Avigdor Gavron, 667-5475.

Several general directories exist for running the major simulation codes. These are:

/users/mcnp

For MCNP4XG

<code>/users/lcs</code>	For LAHET and associated programs. These are the original, unchanged versions.
<code>/users/egs4</code>	For PEGS4. EGS4 can be run using SUPERHET.
<code>/users/superhet</code>	To run SUPERHET. SUPERHET is a code that includes LAHET, EGS4, FLUKA89 and a scintillator code. For example, you can use it to run EGS4 with the MCNP surface geometry.

The entire SUN cross section library resides in `/users/mcnp/mclib`. For the advanced user: There are two separate pointer directories, `xmdir` and `xmdir2`.

Running LCS (LAHET, HTAPE,...)

Copy

```
/users/lcs/lhrun and lhdel
```

to your directory for lahet, htape, etc. then type `lhrun`. The `lhrun` script sets up symbolic links to the necessary executable and library files. You can use `lhdel` to remove them, or just use the regular `rm` command yourself. Up to five command line parameters can be passed to lahet.

```
% lahet inh=inh_1ht histp=hist_1ht neutp=neut_1ht
```

If you expect the program to run for more than a few minutes use the `sub` command, e.g.

```
% sub lahet inh=inh_1ht histp=hist_1ht neutp=neut_1ht
```

Running MCNP

Enter the following command (manually or, preferably, in `.login`, `.cshrc`, or `.tcshrc`)

```
setenv DATAPATH /users/mcnp/mcplib #Note the caps!
```

You should include `/users/mcnp` in your default path. The `DATAPATH` is used to tell your shell where the MCNP and cross section library files are. MCNP can be run with up to five command line parameters.

```
% mcnp4 inp=inp_mcnp outp=out_mcnp
```

If you expect MCNP to run for more than a few minutes, use the `sub` command.

```
% sub mcnp4 inp=inp_mcnp outp=out_mcnp
```

Q REPLAY

Q replay is available on P17H, P17I and P15. This software is minimally supported at the DAC.

Utilities

FIND

This is a utility to access the LANL online phone directory on the VAXcluster. To use, type the following:

FIND or FIND N	(search by name)
FIND P	(search by phone number)
FIND O	(search by organization)
FIND Z	(search by z number)
FIND M	(search by mailstop)

For example, to find the phone number of all the Smiths listed, type FIND and then enter SMITH. To find all people in P-17, type FIND O and then enter P-17. To exit the utility, enter a <CR>.

Finger

Finger is a utility available on the VAXcluster and also on the HPs which tells you who is logged into the system, what the user is doing, and what terminal the user is on. It can also provide detailed information about a user such as an office location and phone number. Type HELP FINGER for VMS or man finger for HP-UX for more information.

```
finger username
```

at the system prompt. Finger can retrieve information from a remote host on the network if that host supports finger. Type

```
finger @hostname
```

or

```
finger username@hostname
```

If you "finger" an individual user, personal information about that user will be listed if it is available. To provide your own personal information, you must file a "plan". A plan is a text file which resides in your home directory. A command procedure that will create a PLAN.TXT file for the NNS VAXcluster can be used to get you started. Just type MAKE_PLAN and enter the appropriate information. It would be useful to have the following three versions available in your home directory on the VAXcluster; only the .plan file is necessary on the HPs.

.plan	For access by UNIX machines (for VMS this file must be created with a text editor - not copied or renamed).
PLAN.TXT	For the NNS cluster.
FINGER.PLN	For the DAC cluster.

GAMMAS

Type the command GAMMAS at the DCL prompt to access the GDISP program on the VAXcluster. This is a program to assist in identifying and to list gamma rays from radioactive isotopes. The data base contains over 73,000 gamma ray lines. Help is available online from within the program.

POD (Physicist on Duty)

This command procedure allows you to read the current POD message on the VAXes during the data acquisition cycle. If you are an authorized POD, you also have privilege to update the POD message and/or send the file by VMS MAIL to users on all nodes, and the MP10REP account on P15. Messages can be sent directly to the terminal for ONLINE1, MP10REP, and PTGT92 data acquisition users who are logged in. To invoke the utility, type `POD`.

<code>READ</code>	Displays the current POD message.
<code>SEND</code>	Sends the file you specify via the VMS Mail Utility.
<code>MESSAGE</code>	Makes the file you specify the current message. A copy of the current message is placed in

`USERH: [POD]POD.LIS`

immediately, and in the NNS BULLETIN BOARD during the 4 a.m. message count. If you wish to edit this file (perhaps to append a message to it) feel free to do so.

<code>DELETE</code>	Displays a blank file - no message seen.
<code>BOTH</code>	Sends the file you specify via mail, and to the POD utility.
<code>TERM</code>	Broadcasts a short message to ONLINE1, MP10REP, and PTGT92 users who are logged in.
<code>HELP</code>	Displays this text.
<code>EXIT</code>	Leave the POD command procedure.

INDEX

This utility analyzes FORTRAN source routines and produces two different kinds of listings. It is available for VMS and HP-UX. For more information type `HELP INDEX` or `man index`. See also **TIDY**.

TIDY

This utility is available on the VAXcluster and the HPs. Tidy renumbers, edits, and tidies FORTRAN source programs. For more information, type `HELP TIDY` or `man tidy`. See also **INDEX**.

XSYS Hints

XSYS is a data acquisition system for VAX computers using the MBD-11 CAMAC branch controller. Originally developed at Triangle Universities Nuclear Laboratory (TUNL), the version used at NNS is one extensively revised at the Indiana University Cyclotron Facility (IUCF).

XSYS Data Acquisition

XSYS data acquisition is available on all the VAXcluster data acquisition computers, e.g., those with an MBD and CAMAC crate attached. At NNS a special account has been set up for data acquisition users: ONLINE1. Only the ONLINE1 account can communicate with the MBD and CAMAC. The ONLINE1 account is shared by many experimenters; therefore subdirectories are used to keep the data separate. XSYS will store your data files on disk in this subdirectory. In general, one computer is assigned to one experiment, but the computer may be reassigned to another experiment during a LAMPF run cycle should the need arise. As a courtesy to other users (and to prevent loss of your data) always back up your data immediately and delete them from the ONLINE1 account. Use another account (see below) for data analysis and replay. Manuals for XSYS are available in the group office or from a system manager.

MBD

Three items to keep in mind about the MBD/XSORT:

1. The MBD can get into a state where it is latched up – it will not run even if you reboot, and will usually cause the computer to hang or reboot when `EVOP SETUP` is run. The solution is to power down the MBD (switch its power supply off and on). Make sure XSORT is not running; *the computer may reboot when you power down the MBD.* The MBD code can still be loaded; the problem is between the crate controller and the MBD.
2. Sometimes after powering on or initializing the MBD the CNAF commands will not work (they return `X=0`) until `EVOP SETUP` has been executed once.
3. The scaler subprocess in XSORT sometimes has trouble getting access when it wants so it is set up to retry. When this happens, it usually works on the second try and a warning message, `MBD ERROR - scalers...` is sent to the `ONLINE1` user's terminal. This warning can normally be ignored. Only if you get multiple warnings followed by a failure do you need to report it to `SYSTEM`. It is always wise to switch the crate controller(s) to offline before powering a CAMAC crate off and on. Also, having a LAM waiting when starting `EVOP SETUP` can sometimes cause problems.

Shutting Down a CAMAC Crate

The procedure for shutting down a CAMAC crate (to change a module for example) is as follows:

1. Type `HALT` to stop taking data.
2. Take the crate offline using the switch on the crate controller in the crate.
3. Crate may now be powered off on, etc.
4. With the crate powered on, `C` (clear) and `Z` (init) the crate using the manual switch on the crate controller. If the `C` and `Z` lights do not light on the controller, then your MBD is hung and must be switched off and back on. **CAUTION:** This requires shutting down and rebooting the computer. The switches are on the MBD power supplies.
5. Put the crate `ONLINE`.

Note There should be no LAMS waiting at this point. If there are, you need to gate your electronics to keep LAMS from being set in your CAMAC modules. LAMS upon startup often cause problems with the MBD.

6. Type `EVOP INIT` to put your CAMAC modules back in their proper (programmed) states.
7. Type `BEGIN CONT` or `BEGIN NEW`, etc.

Power

If your system shows no sign of life, check the Topaz Power Conditioner located near the VAX. These power conditioners have their own circuit breakers built into the ON/OFF switch.

Note These devices are rated at 1200 Watts. One is not sufficient to power both the computer and a rack of NIM bins and CAMAC crates. Many experiments have two or more for this reason.

Rebooting a VAXstation

Occasionally, you may find it necessary to reboot a computer due to a power failure or other problem. The VAXstation II/GPXs can not automatically reboot following a power failure. The VAXstations on the cluster need to boot from the system disk on P17H. For this reason, they boot across the network. If your VAXstation is already displaying the boot prompt, `>>>` on the console, just enter

```
>>> B XQ
```

If the VAXstation seems hung, e.g. no response from the keyboard or mouse, and you need to reboot, use the halt button on the front panel to put the computer in console mode. The halt button is labeled **HALT**. Press this button twice and the boot prompt, `>>>` should appear. Then enter `B XQ`.

Note Carefully read the section "Recovery Procedures" in the introductory section of the XSYS manual to understand how to recover from hardware/software problems during data acquisition.

Tape Dumps

Two main files, `RUNCOM.EXE` and `TAPEIT.COM`, are needed to perform automatic backups of data from disk to tape under XSYS. These two files

should be copied to the user's directory. Two other files, DUMP.EVL and END.COM are used to run the backup procedure. Samples of these four files are in XSYSDISK: [EXAMPLES].

RUNCOM.EXE	Is a shareable, executable image which is called from EVAL. Executes a command file which does the backup.
TAPEITP.COM	Is the command file executed by the process created by RUNCOM. May be simplified considerably depending on the user's needs.
DUMP.EVL	A sample EVAL program that runs RUNCOM.EXE based on a scalar value (clock).
END.COM	Executing END.COM causes TAPEITP.COM to halt the run and do the dumps to disk and tape without restarting a run.

A sample command file to do dumps at set time intervals, LOOP.COM, is also included in XSYSDISK: [EXAMPLES].

Note Users should be certain they understand these procedures before using them during data acquisition.

Running XSORT Non-interactively

Running XSORT as a detached subprocess, e.g. non-interactively, allows you to log out of all windows. This is especially useful for unattended operation. Also, logging out helps keep unauthorized persons from meddling with your run or destroying your data. You will still be able to stop XSORT, change your EVAL code, etc. and then restart XSORT from any remote location by logging in to the same account. To run XSORT as a detached subprocess, use the XSYS command

```
$ EVOP SETUP* filename
```

Once the process is created, you can log out.

Occasionally, XSYS returns an error when trying to create a detached process. This is usually caused by the XDATA.SEC global section size being too small. Increasing the global common area by allocating more memory (see the XSYS AMEM command) solves this problem.

You will need to stop the XSORT subprocess to use a new DAP file or a different FORTRAN sorting subroutine. The normal method of terminating the subprocess execution is

```
$ HALT      !Only if data is on
```

To stop it, you type

```
$ EVOF EXIT
```

and answer yes to the question: Do you really want to stop? If you want to kill the subprocess, which may still be running after a HALT instruction, e.g. to use a new DAP file, type

```
$ STOPSUB
```

This command stops all active XSORT subprocesses owned by the UIC of the process that runs the command. All other subprocesses in the system are unaffected. If the command is invoked with the optional parameter CONF, the user will be prompted for confirmation before each subprocess is stopped. Normally there is only one data acquisition subprocess.

Fixing XSYS Event Data Files

If XSORT is aborted while writing an event data file the output file will not be properly closed. The command

```
$ DIRECTORY/SIZE=ALL
```

will show that the file uses 0 blks/"x" blks, indicating that 0 blocks are use out of "x" blocks allocated. To recover the data written before XSYS aborted, type

```
$ SET FILE filename.ext/END
```

This writes a file mark at the end of the data, and except for possible incomplete records at the end, should allow use of the data that were written.

XSYS Data Analysis and Replay

XSYS data analysis is available on all computers on the VAXcluster. Data analysis and replay should never be performed from the ONLINE1 account. The ONLINE1 account is reserved strictly for data acquisition. Data analysis should be performed off-line from your own account.

Analyzing Data

To analyze data from your user account, execute the ulogin procedure by typing

```
$ @XSYSDISK: [COMMAND] ULOGIN
```

A symbol for this command can be put in your login.com file. For example,

```
$ XSYS ::= @XSYSDISK: [COMMAND] ULOGIN
```

and then you can just type XSYS to execute the procedure.

Changing Analysis Jobs

It is possible to change analysis jobs (i.e. XSCOM.SEC and XDATA.SEC files) without logging out, then in again to another directory. All you need to do is redefine two XSYS logical names to the sub directory of your choice.

```
$ DEFINE XDATDIR [directory.subdirectory]  
$ DEFINE XNAME subdirectory
```

XSYS Batch Processing

Running XSYS analysis or replay in batch mode is the preferred method for CPU intensive or long jobs that might tie up other resources such as tape drives because it does not interfere with interactive users and allows you to run jobs during non-peak work hours. This also allows you to log out of all windows. See also **Batch Processing** earlier in this manual and the related topic **Running XSORT Non Interactively**, above.

To run XSYS batch jobs from your user account, make the first line in your command procedure

```
$ @XSYSDISK: [COMMAND] ULOGIN
```

This tells the job to execute the standard XSYS login procedure to define the necessary logicals. The remaining lines will then be your DCL and/or XSYS commands (with the \$ at the beginning of each line). You may then submit the job to a batch queue with the `SUBMIT` command and log out. If you are logged in when the job completes, you will be notified on your terminal.

XSYS Graphics Printing

You can use the XSYS `DISP` command to create a plot file for the LN03+ laser printer. When you enter the `9p` command the file `XDISP.LN3` is created which can then be printed on an LN03+ using the command

```
$ LN03 I=XDISP.LN3 F=G O=queue
```

The `DISP 9p` command can also be used in command files including those submitted as batch jobs. In this case the format of the command is

```
$ DISP 4v9pq
```

where `4` is the data area number, `v` is for view, `9` is the graphics device, `p` is for plot, and `q` is for quit. Type `XHELP DISP` for more information.

PC Networking Hints

These notes are to aid PC users in navigating the channels of the FTP Software, Inc. PC/TCP networking software. EM4105-Plus, (and EM4010-Plus), the terminal emulation software in use on PCs at NNS, support terminal emulation and multiple sessions over Ethernet if the FTP network software is installed. For more information refer to the *PC/TCP Command Reference* manual, the *PC/TCP User's Guide*, and the *Configuring PC/TCP* manual, and the *EM4015-Plus FTP Network Supplement*. PC/TCP is based on UNIX software and hence uses UNIX style commands. Note that there are differences between all of the various implementations of UNIX by different companies, i.e. what works for you on one system won't necessarily work on another - refer to the documentation for the specific system on which you are working. The PC/TCP network software is predominantly written as a DOS program although the current version does have a number of Windows capabilities. Unless otherwise specified the following refers to PC/TCP commands that are entered at the DOS prompt. The four Windows applications are relatively easy to use. The DOS applications (also available in Windows) require a knowledge of some UNIX-style commands and some explanation to use.

This chapter covers remote connections (telnet), file transfers (ftp and ftpsrv), remote backups (tar), mail (pop3, vmail, and smtpsrv), remote printing (lpr and predir), and remote disk sharing (idrive).

Initial Setup

If you do not already have PC/TCP installed and set up on your PC, ask a system manager for help. You will need to obtain a network address for your PC and other addresses before installing the software. The minimum hardware requirements for running this software and Windows is a 386 with at least 4 MB of memory - more memory and a memory manager that allows the network drivers to be loaded into high memory are helpful - and an Ethernet card. Once the software is installed, you will need to edit the c:\pctcp\pctcp.ini file, and will probably want to create a c:\pctcp\hosts.txt file to define aliases for hosts you frequently access to make it easier to connect to them.

<p>Note All PC/TCP users are required to set up a password file to avoid unauthorized access to your hard disk and to limit authorized access to only the directories that you specify. See Disk Serving later in this chapter for information on how to do this.</p>

Before editing c:\pctcp\pctcp.ini, you should read through the rest of this chapter for other changes you may want to make to this file. In the [pctcp general] section of pctcp.ini, you should change

```
user=username
```

to your username on the remote system to which you usually connect if the name entered is not the correct one. **Do not change the ip-address, router, or subnet-mask information in pctcp.ini without first checking with a system manager.**

Host Aliases

You can make it easier to connect to a remote host by creating a `c:\pctcp\hosts.txt` file. This will allow you to use an alias, or a shortened version of the host name to connect.

```
;Example hosts.txt file
;address          full name          alias
128.165.53.250   lampf.lanl.gov          dac
128.165.51.31    p17ua.nns.lanl.gov      hp1
128.165.51.32    p17ub.nns.lanl.gov      hp2
```

If you do not know the address of the host but only the name, you may be able to find the address by logging in to the VAXcluster and typing the command:

```
$ mu nslookup hostname
```

Loading/Unloading Network Software

If you run into memory space problems (and hence slow application response in Windows, or the inability to run large DOS programs), you can load and unload the network software. To load the software, create the file `neton.bat` which contains

```
nethind
predir config or predir    Dependent on your setup.
predir printer off        Turns off remote printing.
ethdrv
idrive                    Optional – not in use yet.
```

To unload the software, create `netoff.bat` which has

```
idutil -u                Unloads idrive – use only if installed.
inet unload              Unloads ethdrv.
predir unload            Unloads print redirector.
```

Note The order of the lines above is important.
--

Telnet (tn)

You can connect to an Internet host (VAX, HP, etc.) using the PC/TCP DosApps icon **TN** or the PC/TCP Winapps icon **WTNVT**, or you can connect by entering the host name at the DOS prompt. However, the terminal emulation capabilities provided with these commands are not as good as those provided with EM4105-Plus. You should install and use the networking options that support FTP PC/TCP which are on your EM4105-Plus diskettes. In the Main Setup menu, select FTP as the network to use. Then when you run EM4105 you will see a screen similar to the one below.

NETWORK MENU

FUNCTIONS AVAILABLE

1. Return to Emulation Mode
2. Connect
3. Resume Session
4. Disconnect Session
5. Network Parameters
6. Exit to DOS

Enter Selection: _

If you enter 2 to connect, you will be prompted for the node name. A message appears to verify the connect, and then you are prompted by the host for the username and password. To create additional sessions to other hosts, return to this Network Menu by pressing **ALT N**. Multiple sessions are managed from the Network Menu by returning to the menu with **ALT N** and selecting Resume Session.

Note Do not forget to log out of all sessions before exiting EM4105.

Disk Serving

When you click on the **FTPSrv** icon you start a process which makes your hard disk available to remote nodes on the network. You are unable to run any other applications while the FTPsrv process is running. Whether you plan to use FTPsrv or not, **all users must set up a password file** to improve the security of their systems by preventing unauthorized network access.

Note *Anyone can change the access password at your PC! Take proper precautions such as locking your door when you leave to make sure that your PC is physically secure.*

You must edit the `c:\pctcp\pctcp.ini` file to configure the software to use a password file. Using the `confedit` command at the DOS prompt in the `c:\pctcp` directory is usually most convenient. The DOS editor or other editors can also be used. `Confedit` is a menu-driven screen editor that comes with PC/TCP. Use the "F6" key to search for the `[pctcp general]` section of the file, if it is not already at the top of the screen. Then enter a new line or edit the existing commented-out lines (lines beginning with a ";") to read:

```
pfile=c:\pctcp\abcd.dat
```

Next create the `c:\pctcp\abcd.dat` password file. The password file requires a tab character to specify the directories to which to limit access. **The DOS screen editor replaces the tab character with spaces.** Therefore, use `edlin` or `WORD` to create the password file as follows:

```
p17user::p17 group access:f
      (tab) f
```

where "p17user" is the access ID, "p17 group access" is just an arbitrary name, "(tab)" is only to indicate the position of the required tab character, and "f" is a "virtual disk drive" which is defined by a `SUBST` command in your `autoexec.bat` file. You may want to limit access to `c:\public` only. The following steps explain how to do this.

1. Create the directory with the `mkdir c:\public` command.
 2. To define a virtual disk, f, add `subst c:\public f:` to your `autoexec.bat` file.
 3. You may also have to add a line, `lastdrive=z`, in your `config.sys` file.
 4. Finally, you must type `passwd pl7user` at the DOS prompt, and enter a password at the prompt. If you wish to use a common group password see a system manager.
-

File Transfer (ftp)

Network file transfers with ftp are orders of magnitude faster than transferring through a terminal server connection or modem. Ftp can be used to transfer files to and from any computer on the Internet (VAXes, HPs, Macs, PCs, etc.) as long as an ftp server is running on the host. A public directory has been created on the office Macs to allow the exchange of files (mainly useful for WORD, EXCEL, and ASCII text files) over the network. You will need to request that the server be started by the group secretary or system manager and obtain the username and password.

Ftp can be started on your PC by double-clicking on the PC/TCP Winapps **Wftp** icon, the PC/TCP DosApps **Ftp** icon, or directly from the DOS prompt using the `ftp` command. The easiest method to use is the **Wftp**.

1. Double-click on the **Wftp** icon to start the ftp client.
2. **Note** By default **WFTP** saves a password (in encrypted form) when you save a session. This makes it very convenient to restart a session with a host. There is little danger that anyone will learn your password. However, if you have any concerns about the physical security of your PC - do you leave it unlocked and unattended so that others may have access to it? - then disable the automatic saving of the password from the Settings option before starting a session.
3. When the **WFTP** screen appears, click on **Session**, and select **New** to create a new session.
4. In the **New** dialog box, enter the hostname, your username and password for the remote host. (Asterisks appear in place of the password.)
5. **WFTP** will put you in your home directory on the host. You can change directories, copy, rename, or delete files on the host or the PC.

Backup of Disks

Entire PC hard disk drives or individual directories or files can be backed up to 4mm tape (or to any tape or disk available on a remote host). The command to "tape archive" a directory and all of its subdirectories is:

```
tar cvf p17user@p17ua:/dev/rmt/0mn .
```

where the "." at the end signifies to start with the current default directory (e.g. c:\). The "." can also be replaced by a directory name, a list of files, or some combination of these. You can add a "z" to the "cvf" string to compress the files, but the 4mm tape drives already do compression so it is not clear whether this is worth using.

To restore two files from the archive, type

```
tar xvf p17user@p17ua:/dev/rmt/0mn .\dir\filename .\dir\filename
```

To restore all files simply omit the `.\dir\filename`. Include the "z" switch if the files were compressed originally. The switch `tvf` will list the files in an archive on tape. Because tar handles all of the tape initialization and mounting, **it is very easy to overwrite all previous contents of a tape!** Unless you are sure you don't need what is on your tape, it is best to start with a new tape when doing a new tar. You must list or skip past any old files to add a new tar to the end of a tape. **Use caution!**

It is also possible to set up defaults for tar in the [pctcp tar] section of `c:\pctcp\pctcp.ini` so that less needs to be typed in on the command line. However, tests show that to do a backup (cvf) you must type the entire line shown above. For a listing (tv), if the [pctcp tar] section of `c:\pctcp\pctcp.ini` is set up as follows, then you need only type `tar tv`:

```
[pctcp tar]
user          = p17user
host          = p17ua
file         = /dev/rmt/0mn
```

The `rmt` command allows remote positioning of the tape drive. Unfortunately `rmt` is not compatible with HP-UX. You can work around this problem by logging into P17UA remotely and using the `mt` command. The command `mt rew` rewinds the tape, `mt eod` skips to the end of the data files on tape, `mt fsi #` skips forward # files, and `mt bsi #` skips back # files (`mt fss` and `bss` do not work). Unlike under VMS, the tape drive is not protected from access by other users – any authorized user can access the drive while your tape is in it, so please be careful.

Note At present only P17UA, the HP in the computer room in building MPF-407, is set up for tar operations – it has one 4mm tape drive available. Also note that if you have a `.cshrc` or `.tcshrc` file in your directory on P17UA and try to use your account in the tar command, e.g. `tar cvf monika@p17ua:/dev/rmt/ mn .`, the tar command will not work unless you rename the file to something else, e.g. `mv .cshrc .cshrd`. To avoid this, use the **p17user** account.

Printing (Remote)

The PC/TCP software includes terminate and stay resident (TSR) programs which allow remote printing from within Windows. When running, these programs can intercept the plot or text that you thought was going to your LPT port. The command `PREDIR PRINTER OFF` entered at the DOS prompt (from within Windows is OK) will disable the print redirection and allow you to print normally through your LPT port. However, you will probably want to enable print redirection to allow the use of the QMS PostScript printer and the Tektronix Phaser IIPxi **color** PostScript laser printer.

Setting Up Remote Printing

There are a number of steps to setting up print redirection properly.

- Edit your `autoexec.bat` file and change the line `PREDIR` to `PREDIR CONFIG`.
- Using the `confedit` command, set up the following sections of `c:\pctcp\pctcp.ini`.

```
[pctcp print]
prog           = c:\pctcp\lpr.exe
spool          = c:\pctcp\spool
swap          = c:\pctcp\swap
printer       = lpt1
timeout       = 5
```

```
[pctcp lpr]
server        = 128.165.51.8
printer      = p17hq_ps
```

The above sets up the QMS PostScript printer as the default network printer. The Phaser color printer is referred to as `phaser_ps`.

- Then use the DOS `mkdir` command to create the subdirectories
`c:\pctcp\spool`
and
`c:\pctcp\swap`.
- If you do not already have the drivers on your disk for the network printers then you need to find your original Windows diskettes (numbers 6 and 7). From **Main - Control Panel - Printers** choose the appropriate printer and run **Add**, then do connect to set it up on the proper port. You must also change the printing configuration in Windows. From **Printers** (in **Main - Control Panel**) set **Use Print Manager** to **OFF**, and from connect set **fast printing direct to port** **OFF** also.
- Reboot your computer and you should be able to print to the network printer listed in the `pctcp.ini` file.

Switching Printers

To more easily switch between the printer port and the remote printers, set up two `.bat` files and choose two Window's icons to execute those `.bat` files. For example create `rpon.bat` which should contain the command line

```
predir printer lpt1
```

to turn remote printing on, and create `rpoff.bat` with the command line

```
predir printer off
```

to turn remote printing off. Then follow the instructions in your Windows manual on how to create icons to run applications.

At present there is no easy way to switch to the Phaser color printer from the QMS; however, one technique is to create a .bat file using the lpr print command and to create a Windows icon to run it. This method requires changing the printer setup in WORD to print to an encapsulated PostScript file (with a standard name such as phaser.prn). The .bat file should then contain

```
lpr -P phaser_ps phaser.prn
```

Note Letter must be a capital -P not a small -p.

Executing this file after printing from WORD will then send the file to the remote printer. You can also edit c:\netcp\netcp.ini again to change the default network printer from the QMS to the Phaser.

Print Queue Utilities

Lpq allows you to check on the remote printer queue to see what the hold-up is in printing your job. The **lprm** utility allows you to remove a print job from the queue if you decide that you printed the wrong file. You must use **lpq** to get the job number of your print job, then type

```
lprm job-number(s)
```

to delete the job from the queue. Alternatively you can type

```
lprm username
```

to remove all of your jobs from the queue.

Mail

There are a number of mail protocols available in the PC/TCP software; we use two of these. **FOP3** and **VMAIL** allow users to read, delete, etc. their email that is sent to a VAX. SMTP mail and the **SMTPsrv** utility allow users to send and receive mail directly on their PCs. To use either of these mail utilities the c:\netcp\netcp.ini file must be edited. Using the

`confedit` command at the DOS prompt is usually most convenient. Use the F6 key to search for the `[pctcp smtp]` section of the file. Then enter a new line or edit the existing commented-out lines (lines beginning with a ";") to read:

```
[pctcp smtp]
default-host    = username.nns.lanl.gov
spool           = c:\pctcp\mail
user-path       = c:\pctcp\mail
```

While you are at it, edit the `[pctcp vmail]` section as follows:

```
[pctcp vmail]
client section  = pop3
ignore-fields   = Received Message-Id Sender
                  Originating-Client Path
highlight-fields = Subject From:
```

and edit the `[pctcp pop3]` section to read:

```
[pctcp pop3]
toplevel-directory = c:\pctcp\mail
user               = username
client             = username
server             = p17h
default-mbox       = default
max-sync-descs     = 0
```

With these setup you should be able to type `pop3` at the DOS prompt (or define a Window's icon to run `pop3.exe`) to see if you have any new mail on the VAXcluster. If your mail is usually delivered to another host, then you should set that host as your server in the above. Once you have new mail from `pop3` you can run `vmail` (from the DOS prompt or within Windows) to read, forward, delete, or whatever your VAX mail. `vmail` commands are listed in the User's Guide or can be found by typing `? in vmail`.

If you wish to transfer old mail on the VAXes to your PC, then you must define a logical name on the VAX host. In your `login.com` file, in the section which is executed no matter the mode of login, on the VAX host enter

```
$ define MULTINET_POP3_FOLDER "MAIL"
```

where "MAIL" refers to your mail folder (other folder names can be used as well). The network software is case sensitive so MAIL, Mail, and mail are all recognized as different (and the last two as normally non-existent) mail folders. Running **pop3** with the above set will transfer all of your "saved" VAX mail to your PC and it will delete the mail from your **VAX MAIL folder!** Using

```
$ define MULTINET_POP3_AUTO_NEWMAIL TRUE
```

you can make **pop3** save your new mail into the standard mail folder, as is done automatically on the VAX, after it is read. Otherwise the mail stays in the newmail folder.

Using the UNIX-style **mail** command at the DOS prompt you can send mail over the Internet from your PC. Remember that Internet addresses are of the form **user@lampt.lanl.gov** or **user@node.bitnet** or **user@node.net.edu**, etc. (**vmail** also uses the SMTP utility to send or reply to mail.)

Running the **SMTPsrv** utility allows you to receive mail directly on your PC using the PC's Internet address (**128.165.51.10x** or **user@hostname.nns.lanl.gov**). You can create a .bat file to execute **SMTPsrv**, then create an icon for the .bat file (in Windows) and run the **SMTPsrv** process in the background to receive mail while working at your PC. Mail sent to your PC while it is turned off will be held on P17H until you run **SMTPsrv**. The held mail will be delivered either when you next are sent new mail or when the server process performs its next scheduled check to see if held mail can be delivered. Because most PCs' hostnames are equivalent to the username, proper addresses for sending mail to your PC (from a VAX, say) are of the form

```
smtp%"user@user.nns.lanl.gov"
```

or

```
smtp%"user@[128.165.51.10x]".
```

Idrive

With the **idrive** TSR program loaded, and when we have set up servers on the VAXes and HPs, it should be possible to mount the remote disk drives directly on your PC. This will allow access to large data files, etc. without physically copying them onto your PC hard disk (as you would using the **ftp** utility). Please be patient while we work on setting up and testing this feature. At present there is no need to load the **idrive** program on your PC – it isn't used for any of the other network features.

Mac Networking Hints

These notes are to let Mac users know about the network capabilities available to them and to provide some hints on software setup and use. To use these capabilities you will need an Ethernet card, System 7.0 or higher, VersaTerm-PRO Version 3.6 or higher, and the Eudora software for electronic mail. You will need to obtain a network address and additional information for your Macintosh – see a system manager.

Telnet

You can now use the Versaterm-Pro Telnet Tool to log into any P-17 VAX or HP as well as the DAC and most other hosts around the lab or even the world. To use telnet, you need to know the IP (Internet) address of the host. Some local addresses can be found under **Network Addresses** in the **Network Access** chapter. If a host you wish to access does not appear in this list, you may be able to find its address by logging in to the VAXcluster and typing:

```
$ mu nslookup hostname
```

Setting Telnet Parameters

Although setting up all the hosts you want to access takes a little time at first, it is worth doing because once done you will be able to access the hosts with a few clicks. A maximum of eight sessions can be opened simultaneously with this method. If you need more than eight, duplicate the settings document (VTpro_data) in the Preferences folder. Then, launch the duplicate and change its **Sessions** menu. To switch between settings documents, use the **Open** command in the file menu.

1. Double-click on **VersaTerm-Pro** to launch the application.
2. Select **Connection Tools** from the **Settings** menu if it is not already checked. Choose **Config...[toolname]** from the **Settings** menu.
3. Select the **VersaTerm Telnet Tool** from the **Method** pop-up menu.
4. Enter an IP address in the **Host TCP/IP Address:** field and click **OK**. Because we are using domain name resolving, the host name should appear in the TCP/IP Hosts window. You can select **OK** and then enter the next IP address until you are through entering the ones you need. At this time, I recommend entering the eight hosts you access most frequently. More addresses can be entered later.
5. Select **Edit Sessions** from the **Sessions** menu. Replace the name, **Untitled**, with the host name or create a new one by clicking **New**. Leave the Initialization string blank.
6. From the **Settings** menu, click on the TCP/IP Host that you want to access, click **OK**.
7. To start the session, select **Open Connection** from the **Settings** menu. Log on to the host.
8. Log off the host.

9. Repeat steps 5 through 8 until you have your eight host sessions set up.

10. From now on you should be able to select your host from the **Sessions** menu, then open the connection from the **Settings** menu.

Switching Between Sessions

1. From the **Sessions** menu, select the host you want to access.

2. From the **Settings** menu, select **Open Connection** and log in to the host.

3. Repeat steps one and two for the number of sessions you want open - up to eight sessions can be open at the same time.

4. Go back to the **Sessions** menu to select a host with which you have already established a connection.

Note *Do not forget to log out of all hosts when through.*

File Sharing - Mac to Mac

The group secretary's office Mac and the other office Mac have been set up as file servers so these disks can be accessed by other Macintosh users in P-17 who are on AppleTalk. You will need to see a secretary or system manager for the username and password.

Note *Do not turn file sharing on for your own Mac until you fully understand how to set up users and passwords otherwise anyone could have access through the AppleTalk network to anything on your disk.*

Connecting to a Shared Disk

1. Select the **Chooser** from the Apple menu.
2. Click the **AppleShare** icon.
3. Click the name of the computer with the shared disk that you want to use.
4. Click **OK**. A dialog box appears for you to identify yourself. Click **Registered User**. Type the password.
5. Select the shared disk you want to use by clicking its name. Click **OK** and the icon of the shared disk appears on the right side of your desktop. Close the **Chooser**.

Disconnecting From a Shared Disk

Drag the icon to the **Trash** or choose **Shut Down** from the **Special** menu. Your computer is disconnected automatically when it is shut down.

File Transfer - MAC to Host

Network file transfers using FTP are orders of magnitude faster than using Kermit or other file transfer protocols. The latest version of VersaTerm-PRO provides FTP capability. You can use FTP to transfer files to or from VAXes, HPs, PCs or other workstations running an FTP server. Check in your VersaTerm-PRO folder for the VersaTerm FTP Client icon. If you plan on using this feature frequently, you may want to make an alias of this application.

To use the FTP Client:

1. Double-click on **VersaTerm FTP Client** to launch the application.
2. To set up a Host/Username either double-click on **Untitled** or select **Config...[FTP Client]** from the **File** menu.

TCP/IP Hosts:

The hosts that appear in this list are being pulled from the same Hosts file in your System folder used by Telnet. Simply select the host name you want. If the desired host is not listed, and you have its Internet Address, use the **Host TCP/IP Address:** field to add a host to your hosts list.

Transfer Type:

The default is MacBinary. Select **Text** for transfers to/from hosts which are not Macintoshes.

Text File Creator:

This option lets you specify the application that should be launched when a Text file received via an FTP transfer is opened from the Finder. Enter MSWD for Microsoft Word, or click the **Select...** button to display the applications on your disk and double-click the name of the application you want, and the code for that application will appear in the **Text File Creator** field.

Username:

Enter the login name you use to access the FTP host.

Password:

Enter the password you use to access the FTP host. The next time you enter this dialog, your password will be replaced with bullets for security purposes.

Dir:

Use this field to setup the host's directory delimiter. VMS uses a period '.'; MS DOS uses a back slash '\'; Unix uses a slash '/'.

Default Host Directory:

Enter your home login directory. The directory can be changed later to another one as long as you have access to it from within the **FTP Client Tool Transfer Window**. For example, on an NNS VAX your login directory would be

```
user_disk:[username]
```

on a DAC VAX it would be

```
p00$disk:[username]
```

and on the office Macs it would be

```
Public
```

3. Click **OK** to confirm the setup for this host.

4. To initiate an **FTP Client session** with a host either double-click on the host's icon or select the host from the pop-up menu.

5. From the **FTP Client Tool Window**, you can select the directory, then the files to send or receive. If you depress the Shift key while clicking on filenames, you will be able to select multiple files.

Mail

The Eudora program allows you to send and receive electronic mail on a Mac. If you want to install this software, see a system manager for the diskette and a manual and just copy the program to your hard drive.

Eudora uses the POP 3 (Post Office Protocol 3) server available on the VAXcluster. The server is set up to automatically save new mail that you have read on your Mac to the MAIL folder on the VAX *if* you configure Eudora for the "Leave Mail on Server" Option. See the Eudora manual for how to do this.

Note *If you do not select this option Eudora will transfer your mail to the Mac and delete it from the VAX. Occasionally, you should log on to the VAX to delete old messages so these files do not get too large.*

Backups

Macs on the AppleTalk network can back up their hard disks to an optical disk mounted in the Dynatek drive on the group secretary's Mac. The Dynatek can be mounted via AppleShare (see directions under File Sharing above) and your files can be copied to the disk or you can use a backup program of your choice. Please check with the group secretary to see if an appropriate optical disk is inserted in the drive.

Another backup option is to FTP your files to the scratch disk on a VAX or HP and then copy the files to 4 mm or 8 mm tape.

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